THE TREATMENT OF THE COMPLICATIONS ATTENDANT UPON CHRONIC GALL-STONE DISEASE.[1]

BY JOHN B. DEAVER, M.D.,
OF PHILADELPHIA,
Surgeon-in-Chief to the German Hospital.

It is well established that in acute obstruction of the common duct operation is not to be thought of until increasing jaundice or a period of chronicity with fever and rapid pulse indicate the need of such interference.

The dangers of suppurative cholangeitis and cholecystitis have been realized for some time, and until hepatic drainage was practised by surgeons, such cases went in too many instances the wrong direction.

Chronic gall-stone obstruction, either with its increasing jaundice or the intermittent form, has called for surgical intervention because of the liability of such stones to cause strictures, ulceration, carcinoma, fistulæ, or damage to the pancreas, and to aid in the production of suppuration of the liver ducts, when infection becomes superadded. As infection of a varying degree is practically always associated with the formation of gall-stones, and as such infection is surely accompanied by a catarrhal condition of the mucous membrane of the common duct, the presence of a calculus, even if not sufficient in size to produce jaundice, will impair the drainage of the duct and induce a train of symptoms causing chronic invalidism.

Practically every case of gall-stone disease which starts with an infection is accompanied by a degree of cholecystitis sufficing to cause adhesions among the omentum, colon, duodenum, stomach, and biliary tracts. The dragging effect of these adhesions, the hinderance to the peristaltic action of the intestinal canal, the obstruction of the free action of the py-

[1] Read before the Chicago Surgical Society, June 1, 1903.

lorus, and consequent dilatation or ptosis of the stomach, are all of sufficient importance to cause symptoms requiring relief. The resources of the attending physician will be taxed to the uttermost to relieve his patient. Lavage of the stomach, change of air and scene, the employment of various cathartics, abdominal massage and gymnastics will be tried one after the other, and all in vain. It is here that surgery offers relief, and especially with the perfection of technique which, *in the absence of infection*, should result in a most favorable manner.

The preparation for a gall-stone operation differs in no-wise from that of any other, except in the presence of jaundice, when calcium chloride may be administered for three or four days previous to operation, in doses of twenty to thirty grains, three times a day. The use of a sand-pillow is a useful adjunct in order to arch the spinal column and give a better exposure to the gall-bladder region. I usually have it placed somewhat below the liver level, which is the point recommended by Mayo Robson, and place the table in a slight Trendelenburg position, three or four inches.

As to the incision, I fail to see any advantage in that made by Kehr; it is not only unnecessarily long, but by dividing two-thirds of the rectus muscle must certainly predispose towards hernia. The incision originated by Mayo Robson gives a perfectly satisfactory exposure of the field of operation, and by splitting the rectus muscle, instead of dividing it, will assure a much stronger abdominal wall. After opening the peritoneum and inspecting the field of operation, the intestines are best kept out of the way by a few well-placed gauze pads, and over these several flat marine sponges. I use the latter because, in spite of all precautions, some bile occasionally "spills," and the sponges soak up the fluid better and more quickly than gauze.

In disposing the gauze and sponges, particular care must be given to the subhepatic space and the region above and below the gastrohepatic omentum. The retention of purulent products in any of these fossæ may give rise to serious consequences later. I hardly believe that Kehr's method of perform-

ing hepatopexy by stitching the liver to the posterior parietal peritoneum is necessary.

The preparation of the field of operation calls for the expenditure of some time and attention to detail. I would no more think of cutting adhesions or searching for a stone without having protected the general peritoneal cavity, than I would rupture a peri-appendiceal abscess in the absence of adequate gauze protection to the intestines.

Adhesions should then be dealt with; and while in some cases a few ligatures and the use of the finger and scissors will be sufficient, in others the most extensive and careful dissection will be called for. Every band of adhesion should be carefully tied and divided, and in the separation of those of a more voluminous nature bleeding should be guarded against by the closest scrutiny.

After freeing the adhesions, the gall-bladder becomes exposed, and the right free border of the gastrohepatic omentum is traced to the duodenum. The gall-bladder holds the same relation to the common duct that the anterior longitudinal band of the cæcum does to the vermiform appendix, and the exposure of the gall-bladder and the free border of the omentum is the exposure of the field of the common duct.

A nice question may arise to be decided when a dilated and displaced stomach due to pericholecystic adhesions has caused marked gastro-intestinal symptoms. The great advances and the brilliant results of a gastro-enterostomy may well cause an operator to pause and consider whether he can successfully break up all constricting bands and prevent their recurrence, whereas a gastro-enterostomy in addition may cause complete relief of the symptoms. Personally, I believe one should be governed by the circumstances of each case; the risk of opening the stomach and intestine is not absolutely *nil*, and the necessity to avoid peristalsis for some hours after operation would perhaps cause extensive readherence of all raw surfaces.

Fistulæ may be directly caused by adhesions of the ulcerating gall-bladder or duct to a neighboring viscus with subse-

quent perforation. They have been observed between the biliary passages and the stomach, duodenum, jejunum, ileum, colon, urinary passages, thorax, abdominal walls, retroperitoneal tissues, and portal vein. In most instances the occurrence of fistula is impossible to diagnose, unless, for instance, a very large stone was passed in the stools or was vomited. As to the relative frequency of fistulæ, Naunyn tabulates forty-three fistulæ in a total of 10,866 autopsies; nineteen between the gall-bladder and duodenum, sixteen between the gall-bladder and colon, five between the common duct and duodenum, and one each between the gall-bladder and stomach, gall-bladder and liver, and between the several bile ducts.

Fistulæ require great caution in their management in order to avoid soiling the peritoneum with bowel contents by inadvertently opening the intestine when cutting a supposed adhesion. These cases call for the expert use of the needle and thread, and require the operator to be the master of all situations and emergencies. The novice at such work may meet with insurmountable difficulties, and leave his patient no better, yes, worse off, than before the operation was undertaken.

The duodenum is sometimes superimposed on the gall-bladder and border of the gastrohepatic omentum, enveloping them as it were, and requiring careful separation and the closure of the opening in the duodenum, if such be made. Such a case was encountered in my practice several weeks ago. In order to expose the right free border of the gastrohepatic omentum so as to be enabled to palpate the common duct, separation of the gall-bladder and duodenum was necessary, and it was found that nature had performed a cholecystoduodenostomy. The dissection was carried to the extent of freeing the border of the gastrohepatic omentum, when palpation revealed the presence of a stone occluding the common duct. The portion of the duodenum containing the opening was completely freed of adhesions, and the opening, which readily admitted the points of the middle and index finger, closed. The common duct was then opened, the stone extracted, and drainage introduced into the proximal end of the duct. The gall-bladder was

then excised close to the junction of the cystic with the common duct. Recovery was uneventful.

A second case, recently, disclosed a like condition, with the common duct communicating by a fistula with the stomach.

Fistulæ following cholecystostomy should close in a few weeks, and their permanence is due to the continuance of obstruction in the common duct, either from a stone or stricture. When the persisting fistula arises from the gall-bladder, a plastic operation should be attempted. Failing by this means, the gall-bladder must be isolated, the fistulous opening closed, a cholecystoduodenostomy performed or the gall-bladder removed; it being understood that the common duct is patulous.

In my experience, fistulæ from the common duct will ultimately heal, though often such healing is slow and tedious. Especial caution must be observed not to inject caustic or other irritating fluids into the fistula. If an operation is indicated, the opening must be sought, the stone or stricture removed, and the duct treated as in a primary stricture, as I will describe farther on. Thoracic and other biliary fistulæ must be opened up and treated according to the indications met with.

The field of lesion having been exposed, the point of lesion must be determined. Stones in the first part of the common duct are easy of removal by incising the duct over the stone, which serves the purpose of a director, and scooping out the stone. The hepatic duct must then be explored and the probe made to enter the duodenum as well, making sure that the probe can be felt through the wall of the duodenum. In case of doubt, the finger must be introduced into the common duct to determine the presence of a stone combined with palpation outside of the duct.

It is much safer to make a routine practice of draining the hepatic ducts than to close up the wound in the common duct with Lembert sutures.

Whenever practicable, the gall-bladder should be dissected free from the liver, ligated, and removed. It will be found to be shrunken and thickened, often containing a few gall-stones with inspissated bile. If the symptoms have been present for

some time without jaundice, a patent common duct can be assumed, and a cholecystectomy performed by a simple ligature with a few sutures to close the peritoneum over the stump.

With a stone in close proximity to the orifice of the cystic duct, the cetomy may be performed first, and the stone gently squeezed out of the remains of the cystic duct. Through the same opening the hepatic drainage can be carried, thus avoiding a double opening, and rendering a future stricture less liable to occur.

In the lower or duodenal end of the common duct more difficulty is encountered. I know of no harder operation in surgery than the effort to remove a stone from such a locality in the presence of numerous adhesions and a deep abdomen. If the stone cannot be forced back into the common duct, into the duodenum, or crushed between the fingers, or removed through an incision in the common duct, the duodenum should be opened through its anterior wall and the papilla slit up from within the duodenum. The stone can thus be reached, and with good technique the duodenum is closed without fear of having caused the escape of intestinal contents.

When the duct, immediately to the proximal side of the ampulla of Vater, is the site of a stone which cannot be crushed between the fingers or dislodged, the duct may be exposed by incising and reflecting the posterior parietal peritoneum to the outer side of the descending duodenum.

Stricture of the common duct sometimes follows ulceration and may cause chronic icterus. It will be detected when the probe searches for a stone in the duct, if not detected by the finger beforehand.

The treatment is somewhat difficult to decide. Perhaps the safest plan, and when the stricture is not absolute, would be to provide for a fistula from the gall-bladder to the duodenum. Where drainage of the hepatic duct was desired, or when the perfect patency of the cystic duct was questioned, the stricture should be divided and a T-shaped tube inserted, one arm extending into the hepatic duct, the other downward towards the duodenum, while the upright is brought out of the wound, as in any drainage operation. The object in using a T-shaped

drainage tube is to immediately establish direct communication between the two ends of the duct and to promote the formation of adhesions and exudates and their subsequent transfer into the walls of a new duct; as in the retention of a catheter in stricture of the urethra after perineal section.

Another method I have followed is to introduce a drainage tube into the hepaticus, and a second tube down the common duct to the head of the pancreas, but not so far as to obstruct the pancreatic duct. These tubes can be connected by a piece of glass tubing. Failing by all these methods, a permanent external or internal fistula would have to be encouraged.

Chronic pancreatitis is a more frequent condition than most of us are aware of, and may simulate very closely a carcinoma of the head of the pancreas. For this reason, I believe that in all cases of obstructive jaundice, where the condition of the patient will permit, an exploratory operation should be performed. If nothing but an enlarged and nodular head of the pancreas is found with the usual universal adhesions about it, even with enlargement of the portal lymphatics a cholecystostomy or a cholecystoduodenostomy should be made and the effect of drainage observed. It is surprising how rapidly the jaundice in some of these cases will clear up, the condition improve, and recovery result. I have had occasion in several cases to perform this operation upon patients who subsequently required reoperation for premature closing of this fistula, and have observed marked decrease in the size of the pancreas.

In this operation the gall-bladder is isolated with gauze and flat sponges and aspirated of its contents. The puncture is then enlarged and the gall-bladder examined for stones; if present, they may be removed with forceps or scoop. A small piece of iodoform gauze is introduced into the bladder and the opening temporarily closed with an hæmostatic forceps. The gall-bladder is then brought into the wound, if possible. A piece of gauze is placed around the gall-bladder in such a manner as to allow the lower end of the gauze to protrude from the lower end of the wound, and the gall-bladder is sutured to the aponeurotic layer of the abdominal wall. Before tying the

gall-bladder sutures the gauze pads are removed, but not the gauze around the gall-bladder. The sutures are tied, the wound in the abdominal wall above and below the gall-bladder closed, the hæmostatic forceps removed, the piece of iodoform gauze taken out of the gall-bladder, and a solid rubber drainage tube carried into the organ. This drains into a receptacle at the side of the bed. When it is impossible to bring the gall-bladder into a position favorable for its suture to the peritoneum, it must be protected by gauze packing after introducing the drainage tube. In such cases it is often safer, and especially where infection is suspected, to pack the gall-bladder off from the surrounding viscera, and a few days later to make the opening with the actual cautery. I have done this a number of times with success. After making the opening, drainage is provided for by introducing a rubber tube into the gall-bladder.

When the enlargement of the pancreas is not great, the jaundice not marked with enough color to the stools to show a patent common duct, and when the gall-bladder appears fairly normal in appearance, I make an internal fistula by a cholecystoduodenostomy.

After bringing the duodenum to the gall-bladder, an incision is made in both, and the half of a Murphy button placed in each. The excess of incision is closed with a few sutures (I never use the purse-string), and the halves of the button brought together. A couple of Lembert sutures may be inserted to perfect the anastomosis and complete the operation.

From a report up to 1897, which Dr. Murphy furnished to Mayo Robson, cholecystoduodenostomy had been performed with the aid of the anastomosis button in sixty-seven non-malignant cases, with only three deaths, these being due to continuous hæmorrhage from laceration of the liver substance on the seventh day, to cholæmia on the fourth day, and to septicæmia on the fourth day, respectively. Of his twelve malignant cases ten died, giving a mortality of 83.3 per cent.

It is important, before performing this operation, to observe whether the cystic duct is unobstructed, because, if the gall-bladder is small on account of loss of function, the opera-

tion is useless. Should the cystic duct be partially or completely obliterated, hepatic drainage is indicated, and when the gall-bladder is diseased, its excision should be performed in addition. Anastomosis of the common duct and duodenum I have performed, but do not consider it a satisfactory procedure.

Hydrops of the gall-bladder is perhaps always due to a catarrhal inflammation (the result of infection) of the mucous membrane of the gall-bladder and with but slight, if any, infection. The mucous glands are stimulated to an advanced activity, and the condition presupposes an obstruction to the cystic duct by a stone, stricture, or swelling. Cholecystectomy is nearly always indicated, and only in certain cases where the infection of the smaller hepatic ducts is suspected to be persisting that a cholecystostomy is necessary. Under these circumstances the gall-bladder could be removed, cutting it flush with the common duct, and using the orifice of the cystic duct to drain the liver. The stump of the cystic duct should always be as short as possible to prevent retention therein of fragments of stone, mucus, etc.

Where the hydrops occurs in an already contracted gall-bladder with adhesions, the dissection from the liver-bed may be difficult and tedious. In such cases I place my gauze pads and sponges very carefully, and exert traction on the fundus of the gall-bladder. A curved incision close to the liver attachment is carried through the serous coat, and partly by the knife or scissors, partly with gauze as in freeing a hernial sac, the gall-bladder can frequently be readily stripped down to its neck and then ligated. If much oozing should occur from any denuded surface of the liver, a few sutures, or even the actual cautery, may be demanded, and thorough gauze packing made against the bleeding surface. In some of these cases Dr. Mayo's operation of enucleating the mucous membrane may be performed with good results. When the dissection is not carried far enough to remove all of the fibrous coat, bleeding from the cystic artery may require its separate ligation before performing the ectomy.

If the probe detects calculi in the common duct or in the hepatic duct, drainage of the latter must be performed in addition to the removal of the gall-bladder.

The question of drainage occupies a prominent place in the technique of all gall-bladder operations. There is never any doubt in the mind of the operator as to the wisdom of draining the suppurative forms of cholecystitis and cholangeitis.

With a gall-stone partially obstructing the common duct and a shrunken, thickened gall-bladder, the most rational operation at first would seem to consist in removing the stone, closing the duct, and excising the gall-bladder. In such cases, in addition to the tubular drainage, I place two strips of gauze, one leading to the stump of the gall-bladder, the other slightly spread beneath the wound in the common duct.

It is safer, however, to drain the hepatic duct at all times, not only on the stand-point of infection, but owing to the likelihood of overlooking stones in the hepatic ducts. Kehr even goes so far as to state that after choledochotomy with suture, "even the most skilled surgeon must count upon overlooking stones in 10 to 15 per cent. of his cases."

I use a smaller sized tube than the latter author when draining.

The question, When is the time of election for performing a surgical operation upon patients suffering with cholelithiasis? has been answered time and again by surgeons. Mayo Robson, in January of this year, believed that "as soon as gall-stones give serious trouble, their removal by operation is the most rational method of treatment, since it is only from the complications, which in many cases of cholelithiasis arise sooner or later, that any danger after operation may be apprehended."

It is my opinion, after a rich experience in complicated as well as uncomplicated cases, that operation should be resorted to as soon as it is definitely known that gall-stones are present.

In support of the lessened mortality and the greater ease in operating which early surgical intervention offers, the expe-

rience and brilliant results of Dr. William Mayo furnish an example and impetus which we would all do well to follow.

The recent statistics published by Kehr speak eloquently for the results of early operation, better than any words could attempt. In 535 uncomplicated laparotomies for gall-stones the mortality was 3.5 per cent. In seventy-one simultaneous operations in inoperable carcinoma of the gall-bladder, common duct, or liver, in diffused suppurative cholangeitis, diffused suppurative peritonitis, and sepsis the mortality was 97 per cent., nearly every case, sixty-nine out of seventy-one, succumbed to the deadly spread of infection or to carcinoma the result of chronic gall-stone irritation.

In 114 operations on the stomach, intestines, pancreas, liver, kidney, etc., 24 per cent. died. These cases were those in which extensive adhesions, chronic pancreatitis, or various changes in the liver and kidney made the operation difficult and the anæsthesia prolonged.

Gall-stones, *per se*, never kill, and fatal infectious cholangeitis is not common in the absence of a stone in the ducts. It is only in the presence of great adhesions, fistulæ, suppuration, pancreatitis, or disease of the liver and kidneys that the mortality rises in direct proportion to the grade of the complication.

Operation is particularly indicated in those cases of chronic calculous cholecystitis without jaundice, and with or without enlargement of the gall-bladder. Like the interval operation in appendicitis with a chronic low grade inflammation, perhaps a fæcal concretion, and with more or less adhesions, the removal of the diseased gall-bladder can be performed with as much celerity and safety as can the amputation of such an appendix.

Unoperated, they give rise to a train of symptoms driving the unfortunate patient to the stomach specialist or to places like Carlsbad. The stones are too large to possibly pass the cystic duct, and the low-grade inflammation is responsible, as I have said, for a sequel of symptoms which lead to chronic invalidism.